

IMAGES IN CLINICAL RADIOLOGY

Scurvy in a 3-year-old boy: MRI features

J. De Cock¹, M. Renard², M. Smet¹, L. Breyssem¹

A 3-year-old boy presented with painful knees (especially the right knee) and difficulty in walking for a few weeks. He complained of lower limb weakness. He was irritable and thinly built. At clinical examination movement of the knees and hips was painful. He had previously been diagnosed with autism. The mother reported that he didn't eat well.

Conventional imaging of the lower limbs revealed several abnormalities. Especially at the right femur, the cortex was thinned, and the medulla had a ground-glass appearance. The junction between diaphysis and growth cartilage showed a distinct zone of rarefaction just cranial of the epiphysis, with triangular defects on the side. The calcification zone was dense and wide (A).

An MRI-scan of the right knee was performed. The medullar bone, surrounding soft tissues and growth cartilage of the distal femur showed a hyperintense signal on the T2-weighted images, compatible with oedema. There was a hyperintense signal underneath the periost, because of subperiosteal hemorrhage (C).

A working diagnosis of scurvy was made. There was a broad differential diagnosis consisting primarily of non-accidental trauma and lymphoma. Rickets, copper deficiency, arthritis, syphilis, leukemia and Henoch-Schonlein purpura were also considered.

The patient was treated with ascorbic acid and dietary modifications were prescribed. There was a significant improvement in the patient's health after a few days. A control radiograph of the lower limbs (B) after three months revealed the patient had recovered completely.

Comment

Scurvy is the disease caused by deficiency of vitamin C and affects collagen-containing tissues. In developed countries, scurvy is rare and can be seen in children with severely restricted diets, related to psychiatric or developmental problems. Bone changes are typical for infantile scurvy and occur at the junction between the end of the diaphysis and growth cartilage. Patients with scurvy can easily be misdiagnosed but promptly helped with vitamin C treatment.

Conventional radiologic findings in infantile scurvy can be diagnostic if the patient presents with the classic radiological features. These characteristic changes occur at the growth cartilage-shaft junction of bones with rapid growth. The knee joint, wrist, and sternal ends of the ribs are typical sites of involvement. In the early phase of scurvy, the cortex becomes thin and the trabecular structure of the medulla atrophies and develops a ground-glass appearance. The zone of provisional calcification becomes dense and widened, and this zone is referred to as the white line of Fränkel. The epiphysis also shows cortical thinning and a ground-glass appearance. As scurvy becomes more severe, a zone of rarefaction occurs at the metaphysis. This area of rarefaction typically involves the lateral sides, resulting in triangular defects called the corner sign of Park. This area has multiple microscopic fractures and may collapse with impaction.

Magnetic resonance imaging shows areas of hemorrhage at the bony and subperiosteal level. Multiple focal areas of marrow oedema throughout the metaphyseal regions can be seen. The marrow appearances on MRI represent focal areas of haemorrhage or small infarcts. Subperiosteal fluid and displacement of the distal epiphysis are often visible as well. The MRI appearances completely resolve with vitamin C treatment. MRI should be recommended especially in the doubtful cases.

Reference

1. Umesh K., Shilpa K.: Scurvy presenting as pseudoparalysis without other classical clinical features: A case report. *The Internet Journal of Pediatrics and Neonatology*. 2009, Volume 10, Number 2.

